Campus Connect: A training scheduling system

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ABSTRACT

This project was designed and developed as a training-scheduling system that helps to create schedules between several users. The system has four components: scheduling module, assignments, and certification, management of data and study material. The project makes use of a greedy algorithm that helps to create schedules and detect conflicts. The algorithm has the following course of action, select available time, find available room, and look for an appropriate trainer based on the constraints set by the user.

Keywords— Scheduling, Greedy algorithm, Scheduling system

1. INTRODUCTION

In organizations and universities, where various training programs are conducted, doing all the arrangements and scheduling manually can be a very hectic task. So, performing these tasks using the help of technology can help reduce a lot of unnecessary work. Various factors such as room's assignments discretions of students, parents, faculties, rooms available are considered in this task. The organizations and institutions where there are several academic units, the situation is worsened by a decentralized preparation of schedule. In the implementation of the project, several elements were taken into accounts such as the use of resources such as rooms or facilities, schedules of subjects taken and offered by other units and schedule preferences, all the factors that affect the scheduling. Also, we can say that during manual checking the chances of conflict-free scheduling are lesser than doing it using any technologies.

1.1 Tools used

Apache is used as the web server, HTML/JavaScript as scripting languages, and MySQL for database communication database. Bootstrap, CSS, JQuery for front end designing.

2. LITERATURE REVIEWED

In this paper [2], an integer programming approach was used for scheduling, scheduling was also done using Genetic Algorithm and for optimizing the scheduling process the Tabu Search algorithm was used.

In this paper [3], The SlotManager describes a model with three major system components; the interface, the database, and the algorithm engine. Data management and report management are handled by the interface. The database is rationalized and contains details for creating the schedule. Conflicts like block-schedule conflicts, instructor schedule conflicts are detected by the algorithm engine, also the engine provides the available resources for creating schedules.

In this paper [4], decision paper capability which is adapted by this model is provided by eClasSked. The information relating to the courses, classrooms and instructors are stored in the information module. System control and modeling mechanisms that produce scheduling solutions are done by the user interface module and optimizations module.

3. SYSTEM DESIGN AND DEVELOPMENT

The client-server system that is a 3-tier architecture concept was used in this project as it is used for on-line implementations. The three components in this architecture are: database for storing the data, Graphical User Interface and application logic for user interaction. Controlled and the distributed scheme is maintained such that remote access can be supported. The algorithm of a system's functionality is contained by the application logic component. In this project, it is referred to as the algorithm engine. To solve the scheduling problems, several approaches were considered, although studies about automation were preferred over manual scheduling. Several implementations were presented by Carter and Laporte to encourage the use of computers to solve scheduling problems that were done manually. The use of algorithms succeeded in the implementation.
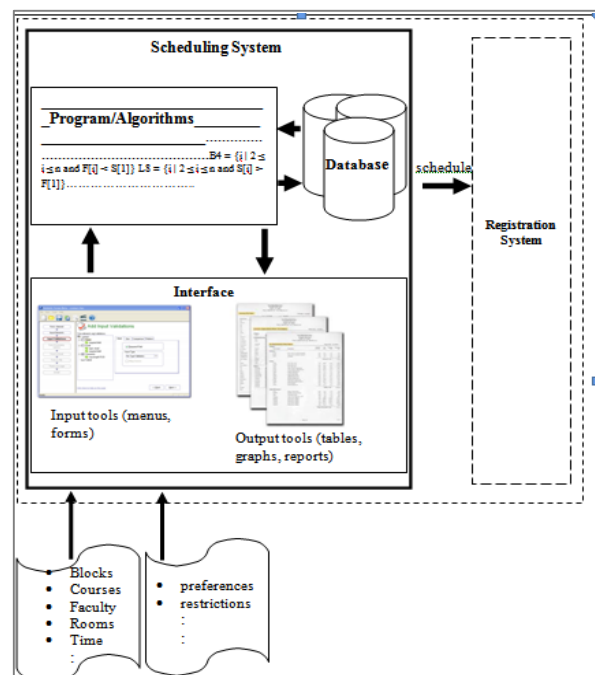

Fig. 1: A diagram showing the top level components of the scheduling system

In this project, a separate module handles each major process. The inputting, deleting and editing of data is handled by the Data Management Module. The task of this feature is to make sure that the needed data of the scheduling entities are entered and fixed to ensure the integrity of the inputs. The Course Assignment Module handles the initial and actual scheduling Courses which have to be enrolled by a certain block are assigned by this module. To create a reliable, conflict-free schedule considering all set of attributes and variables, The Scheduling Module facilitates the management of available time, room, and faculty to fit a certain course assigned to a block. The module features several options for creating a schedule. To copy the schedule of the most recent previous schedule for the same course the copy-previous-schedule option is created. The created schedules are stored in the database with the help of the Result Storage Module. The created schedules are displayed to the users and the system generated information with the help of the View Schedule Module.

The user decides the Privileges and restrictions, for accessing every module. The overall use of the application is managed and used by the training schedule administrator. These administrators will be the main decider of the privileges and restrictions based on the college or institution they represent. Students can manage and control data and scheduling entities associated with their own unit. The students can update their information like the course they want, the duration for which they want the course and accordingly the faculty and the room will be allotted to the student. The students not enrolled in the course, other faculties and parents of the students can also access the application for their specific purposes like viewing the progress of their children, check updates on the study materials or quizzes. The information regarding any student or faculty or course is only provided after the permission granted by the administrator.

4. SCHEDULING BEHAVIOR
The principle of a Greedy Algorithm is used in the scheduling process that is attributed to the Scheduling Module. According to the greedy algorithm, it chooses the best possible path at each decision node. The scheduling is done with the help of three sub-processes that are repeatedly executed in a one dimensional way without backtracking. The first process checks for available time slots in the block for the assigned course. The second process finds a room that can be assigned to the particular course for the time period obtained in the previous process. The third process finds the suitable faculty for the course that is available at the time obtained in the first process and has the requirements for the course that is assigned to the room obtained in the second process. These processes are executed in a particular order and the result at the end of each process is important for the next process. Absence of result from any process can result in malfunctioning of the project. The Greedy algorithm, being optimal in nature, limits the decision making of the entire decision-making process. If there is any situation where at least one process is unsuccessful and there is no other way to rearrange other created schedules to create availability, then the user needs to intervene to arrange the schedules manually.
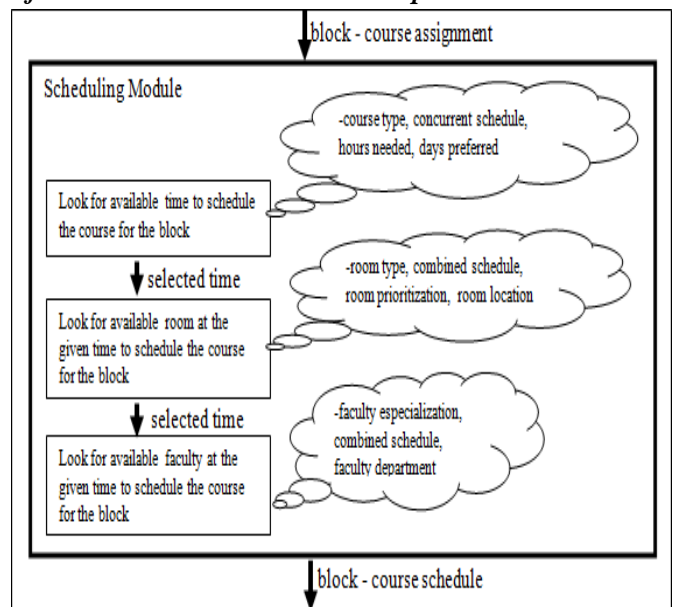

Fig. 2: Scheduling module

5. RESULT
All systems were tested successfully during the partial implementation of the system. Data input is the starting stage of the schedule preparation in which the details about the scheduling entities are entered. These inputs are given forms the base of most scheduling preferences and constraints, therefore offering easy management of data.

6. CONCLUSION
The final output of this project is the web-based training scheduling system that will be used as a tool for preparing schedules for training programs in different training institutions over different academic units. Using this, there is reduce in the errors in the scheduling of the training program and thus fewer delays of classes. As per the requirements of the student they can get their respective courses with the assistance of the best faculty available, also providing proper reports and certifications for the students also providing the related study materials. Also, faculty workload can be managed as the algorithm also schedules the faculty members.

7. REFERENCES
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